

WHAT IS AML?

ABANDONED MINERAL LANDS (AML) INCLUDE ALL ABANDONED MINERAL EXTRACTION SITES INCLUDING HARDROCK, COAL, AND SAND AND GRAVEL MINES, OIL AND GAS AND GEOTHERMAL WELLS, ACCESS ROADS, AND PROCESSING FACILITIES ASSOCIATED WITH THE OPERATIONS.



TALC MINE IN DEATH VALLEY NM



KENNICOTT MILL FACILITIES IN WRANGELL-ST. ELIAS NP&P



OIL AND GAS WELL AT CUYAHOGA VALLEY NRA



CINDER PIT IN LAVA BEDS NM



GEOTHERMAL WELL IN LASSEN VOLCANIC NP



MINE ACCESS ROAD IN WRANGELL-ST. ELIAS
NP&P

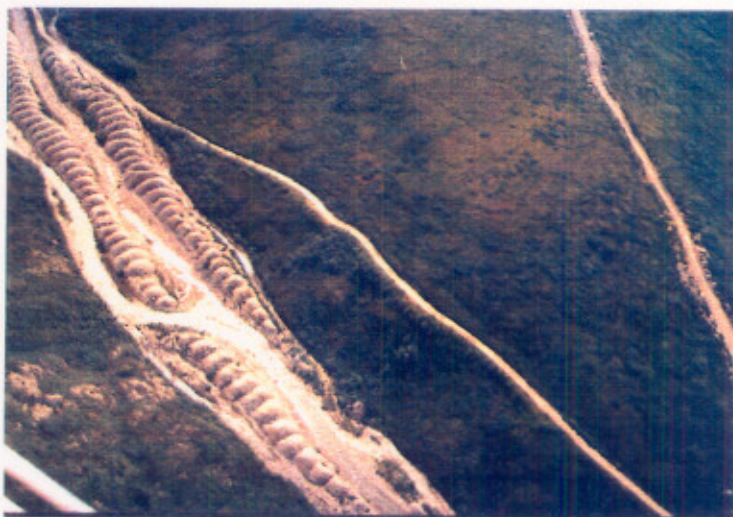
IMPACTS TO RESOURCES

RESOURCE IMPACTS FROM ABANDONED SITES VARY DEPENDING ON THE TYPE AND SIZE OF OPERATION AND THE LOCAL ENVIRONMENT. THE GREATEST IMPACTS ARE TO THE WATER, SOIL, VEGETATION, AND AQUATIC LIFE. IN MANY CASES, THE ECOSYSTEMS HAVE BEEN RADICALLY ALTERED OR DESTROYED. ACID MINE DRAINAGE HAS AFFECTED WATER QUALITY, PLACER MINES HAVE DESTROYED RIPARIAN HABITAT, AND VEHICLES CROSSING THE TUNDRA IN ALASKA HAVE RESULTED IN PROBLEMS WITH THE PERMAFROST. CHEMICAL SUBSTANCES USED AT MINES AND EXTRACTED FROM WELLS HAVE SOAKED INTO THE SOILS, RUINING THEIR PRODUCTIVITY AND CREATING KILL ZONES.

ACID MINE DRAINAGE IN BIG SOUTH FORK NR&RA



PLACER MINE IN DENALI NP&P



KILL ZONE CAUSED BY ACID MINE DRAINAGE IN BIG SOUTH FORK NR&RA

TOPSOIL REMOVAL SITE IN DELAWARE WATER GAP NRA



SAFETY HAZARDS

THERE ARE MANY SAFETY HAZARDS ASSOCIATED WITH ABANDONED SITES. MINE OPENINGS ARE EXTREMELY HAZARDOUS AND CAN CONTAIN VERTICAL DROP-OFFS, BAD AIR, WATER, ROTTEN TIMBERS, LOOSE ROCK, UNDETONATED EXPLOSIVES, AND HIGH LEVELS OF RADIOACTIVITY. RESCUES AT THOSE SITES CAN PUT PARK PERSONNEL INTO DANGEROUS SITUATIONS. DECAYING STRUCTURES, ATTRACTIVE TO CLIMB ON, ARE OFTEN UNSTABLE. ABANDONED OIL AND GAS WELLS CAN LEAK METHANE AND OTHER POISONOUS GASSES.

DANGEROUS HEADFRAME AT THE GOLDEN BEE MINE IN JOSHUA TREE NM



SKIDOO MINE IN DEATH VALLEY NM



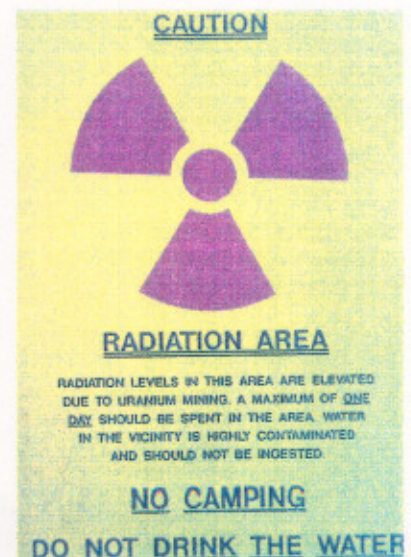
ADIT IN WRANGELL-ST. ELIAS NP&P



METHANE LEAKING FROM A WELL IN BIG SOUTH FORK NR&RA



WARNING SIGN IN CANYONLANDS NP



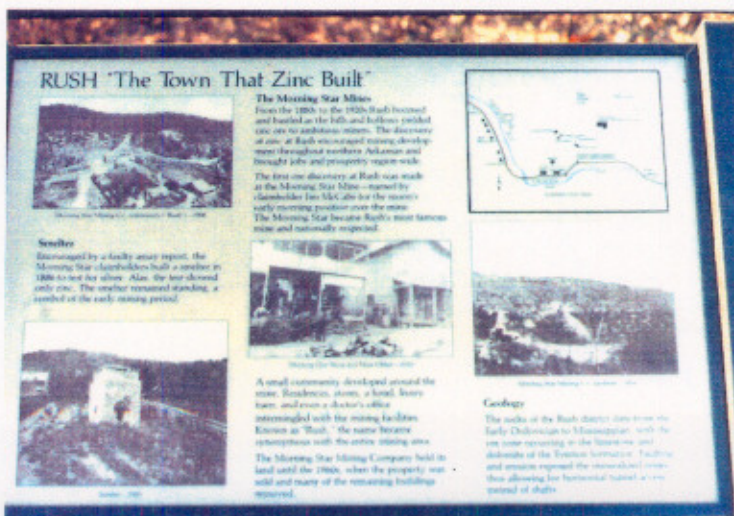
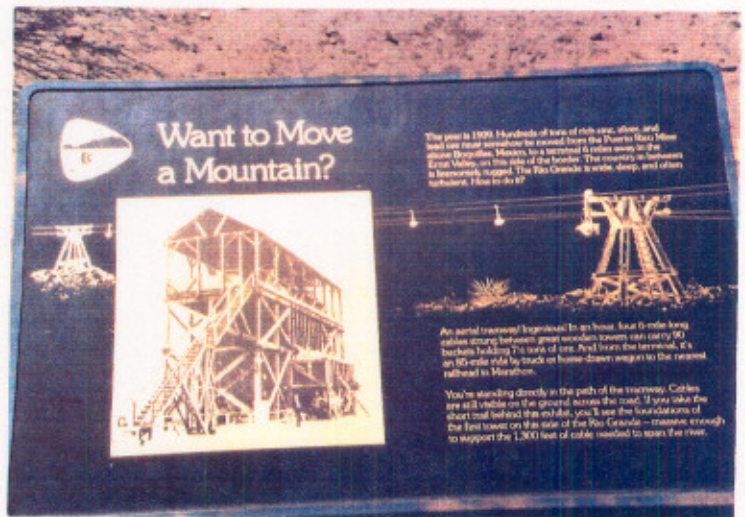
HISTORICALLY SIGNIFICANT AML SITES

PART OF THE NPS MISSION IS THE PRESERVATION OF THE NATION'S HISTORIC AND CULTURALLY SIGNIFICANT SITES. ABOUT 2 PERCENT OF THE ABANDONED SITES IN THE NPS ARE CULTURALLY OR HISTORICALLY SIGNIFICANT. AT SEVERAL PARKS, THE NPS IS INCORPORATING THE THEME OF MINING INTO PARK INTERPRETIVE PROGRAMS. TO ENSURE THAT HISTORIC STRUCTURES ARE NOT LOST FOREVER, THEY MUST BE STABILIZED BEFORE THEY DETERIORATE ENTIRELY.



SKIDOO MILL IN DEATH VALLEY NM

INTERPRETIVE SIGN OF THE BOQUILLAS TRAMWAY THAT ONCE EXISTED IN BIG BEND NP



INTERPRETIVE SIGN AT RUSH VILLAGE IN BUFFALO NR

WILDLIFE MANAGEMENT

MANY AML SITES PROVIDE HABITAT FOR WILDLIFE. IN SOME INSTANCES, THE WILDLIFE ARE RARE, THREATENED AND ENDANGERED SPECIES. IN CASES WHERE AML SITES ARE PROVIDING HABITAT TO SIGNIFICANT WILDLIFE, INNOVATIVE CLOSURES PRESERVE THE HABITAT AND ALSO ENSURE SAFETY FOR VISITORS.



TOWNSEND'S BIG EARED BATS IN THE LAST CHANCE MINE IN GRAND CANYON NP



BAT GATE IN NEW RIVER GORGE NR
DESIGNED TO ADMIT RARE BATS

MITIGATION MEASURES

THERE ARE MANY ALTERNATIVES AVAILABLE TO RESOLVE THE PROBLEMS ASSOCIATED WITH ABANDONED MINERAL LANDS. TYPICAL MEASURES USED TO CLOSE UNDERGROUND MINES INCLUDE INSTALLATION OF FLEXIBLE CABLE NETS, GRATES, OR BAT GATES; BACKFILLING WITH WASTE MATERIAL; AND SEALING MINE OPENINGS BY BLASTING OR WITH POLYURETHANE FOAM. MINE ACCESS ROADS, QUARRIES, AND OTHER SURFACE DISTURBANCE CAN BE RECONTOURED AND RECLAIMED, AND ABANDONED WELLS CAN BE PLUGGED. COSTS CAN RUN FROM AS LITTLE AS \$500 TO SEVERAL HUNDRED THOUSAND DOLLARS, DEPENDING UPON THE SITE, THE AMOUNT OF RECLAMATION, AND THE PRESENCE OF HAZARDOUS MATERIALS.

BACKFILLING TWO OPENINGS AT TERRY MINE IN CAPITOL REEF NP COST \$7,000.



MINE OPENINGS CAN BE BLASTED SHUT. COSTS VARY FROM \$500 TO \$2,000 PER OPENING.

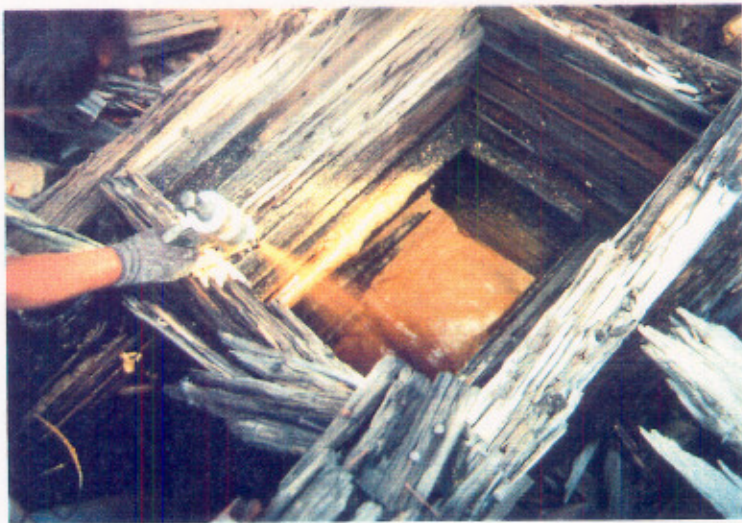


BAT GATE AT KAYMORE MINE IN NEW RIVER GORGE NR COST \$5,000.



GRATES INSTALLED BY HELICOPTER AT VICTORIA MINE IN ORGAN PIPE CACTUS NM. GRATES COST FROM \$700 TO \$8,300 DEPENDING ON ACCESS AND SIZE.





INSTALLING A POLYURETHANE FOAM PLUG. COSTS VARY FROM \$1,000 TO \$31,000 DEPENDING ON SIZE, ACCESS AND SITE CONDITIONS.



RECLAIMED TIMBER HAULAGE AND QUARRY ACCESS ROAD IN REDWOOD NP. RECLAMATION OF THIS ROAD COST \$189,000/MI. SMALLER ROADS COST AS LITTLE AS \$11,000/MI.

RECLAMATION OF JENSIK QUARRY IN CUYAHOGA VALLEY NRA COST \$20,000. RECLAMATION OF LARGER QUARRIES WILL COST SEVERAL HUNDRED THOUSAND DOLLARS EACH.



FIELD INVENTORY AND MONITORING

TRAINED FIELD PERSONNEL ARE CRITICAL TO EFFECTIVELY IMPLEMENT AN AML PROGRAM. PARK STAFF MUST BE TRAINED TO COLLECT SITE DATA. AFTER MITIGATION, SITES NEED TO BE MONITORED TO ENSURE THAT CHANGING CONDITIONS HAVE NOT ALTERED THE CLOSURES.

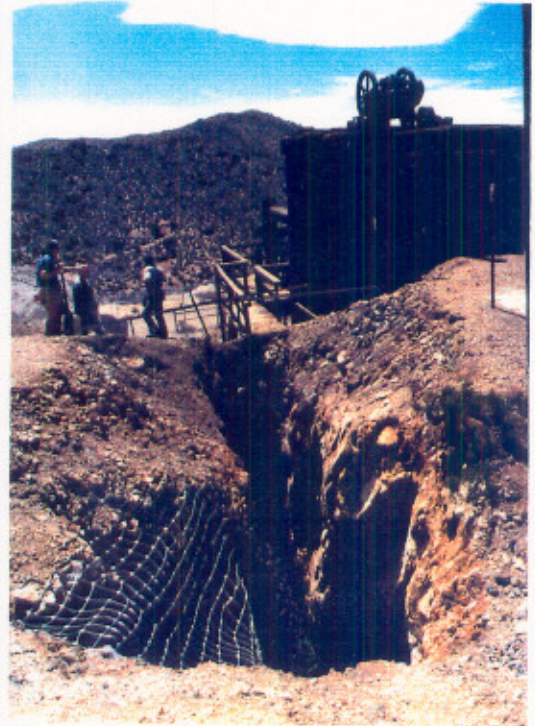
SITE INVENTORY IN GREAT BASIN NP



CUT FENCE AROUND THE ORPHAN MINE IN GRAND CANYON NP



EARTHQUAKE-INDUCED CABLE NET FAILURE AT THE LOST HORSE MINE IN JOSHUA TREE NM



HOLE DUG TO ACCESS SHAFT COVERED BY A STEEL GRATE AT THE DESERT QUEEN MINE IN JOSHUA TREE NM. OF THE 12 CLOSURES AT THIS MINE, ALL HAVE BEEN DEFEATED.